ANALYSIS OF VITAMIN C LEVELS OF CURRY LEAF ETHANOL EXTRACT (MURRAYA KOENIGII L. SPRENG) BY UV-VIS SPECTROPHOTOMETRY

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KEYWORDS	ABSTRACT
Curry Leaves (Murraya koenigii L. Spreng), Vitamin C, UV-Vis Spectrophotometer	Curry leaves (Murraya koenigii L. Spreng) are a source of vitamin A, vitamin B, vitamin C, vitamin B2, calcium, and iron in large quantities. Vitamin C serves to improve the body's immune system by stimulating the production of interferon (Winarsi, 2007). Determination of vitamin C levels in curry leaves (Murraya koenigii L. Spreng) has never been carried out so the following research was carried out to understand vitamin C levels for curry leaves (Murraya koenigii L. Spreng) by UV-Vis spectrometric method. The type of research applied is laboratory experiments. The population was curry leaves (Murraya koenigii L. Spreng) while samples were curry leaves (Murraya koenigii L. Spreng) which were dried in the sun and then extracted using 96% ethanol solvent. The results obtained with KMnO4 are positive, with iodine reagents being negative, and with ammonium molybdate being positive. Positive here means that vitamin C is obtained in the ethanol extract of curry leaves, and negative vice versa. Obtained an average vitamin C level of 3,962 ppm in curry leaf ethanol extract. It was concluded in this study that 96% of ethanol extract in curry leaves contains vitamin C. UV-Vis spectrophotometry succeeded in proving the levels of vitamin C contained in curry leaf plants.

INTRODUCTION

Curry leaves (Murraya koenigii L. Spreng) often known as curry leaves in English are called curry leaves. This leaf is commonly used as a spice in Aceh, as well as in some areas of Sumatra (Firdha, 2022). Although many say that the aroma is langu, once it enters the dish or is processed the aroma will be very tempting (Iskandar et al., 2021). Curry leaves are a great source of vitamin A, vitamin B, vitamin C, vitamin B2, calcium, and iron in large quantities. a kind of osteoporosis and can overcome nausea and vomiting due to digestive constraints (Singh, Mishra, & Jha, 2014).

Vitamin C is an antioxidant in the form of white crystals dissolved in water which has a function as part of the body's defense system against reactive acid compounds in plasma and cells (Sibagariang, 2010). Not only that, Vitamin C has other functions such as making collagen in bones, strengthening the body's strong power, and supporting iron absorption (Rahmawati & Pandansari, 2016).

Scorbic acid another nickname for Vitamin C is a very simple vitamin, that easily changes the effects of oxidation ((Raharjo, 2018) but it is very meaningful for the body because it has many good benefits for health, such as avoiding cancer, helps iron absorption, sharpen consciousness, avoid flu, avoid inflammation, concentrate injury treatment, antioxidants, canker sores prevention agents, and others (Thuraidah & Dairobi, 2015). Vitamin C serves to improve the body's immune system by stimulating the production of interferon (Winarsi, 2007).

Curry leaves were extracted maceration using 96% Ethanol and Vitamin C levels were analyzed using the UV-Vis Spectrophotometry method (Adnina, 2018). Determination of Vitamin C levels in curry leaves (Murraya koenigii L. Spreng) has never been carried out so the following research was carried out to understand Vitamin C levels for curry leaves (Murraya koenigii L. Spreng) by UV-Vis spectrometric method.

RESEARCH METHODS

The type of research applied is a laboratory experiment, using a design to understand Vitamin C for curry leaves (Murraya koenigii L. Spreng) using a UV-Vis Spectrophotometer. The population used in the following study was curry leaves (Murraya koenigii L. Spreng) and samples were curry leaves (Murraya koenigii L. Spreng) which were dried using an oven with a temperature of 50 ° C and then extracted using 96% ethanol solvent.

Tools and Materials

The tools used in this study were glassware (pyrex brand), haldenwanger brand porcelain dish, vital brand suction ball, scores brand micropipette, vial bottle, label, cuvette, analytical balance Ohaus px224 brand, bone brand water bath, and Shimadzu UV-1800 brand Uv-Vis spectrophotometry. The ingredients used in this study were curry leaves (Murraya koenigii L. Spreng), citric acid ($C_6H_8O_7$. H_2O 0.1 M), Ethanol 96%, Ethanol p.a brand ensure merck 1.00983.2500, KMnO4 brand ensure merck 1.05082.0250, Iodine P brand ensure merck 1.04761.0100, Kallium Iodide brand ensure merck 1.05044.1000, Ammonium Molybdat brand sigma-Aldrich 277908-100g and Vitamin C brand ensure Merck 1.00468.0100.

Plant Determination

Curry leaves (Murraya koenigii L. Spreng) were taken and separated between leaves and petioles then determined to ascertain the type of plant used for research.

Simplisia Making Process

The process of making simplistic is carried out by wet sorting first after washing the raw materials, then displaying the simplest raw materials, at the time of drying must pay attention to the drying temperature and drying time, the best temperature at the time of drying does not exceed 60 ° C, the final stage of the simplistic process is dry sorted. Store dried simplisia safely. The next stage is simplistic, blended using a grinder or other pollinating device, then sieving is carried out with a sieve size of 80 mesh.

Extraction

Curry leaf powder weighed 50 g, then 96% ethanol 500 ml was put into a closed vessel. Left for 3 days in a closed vessel and protected from light while occasionally stirring. After 3 days the simplisia is filtered with standard size 0.45 μm filter paper and the filtrate is laid out

in a 500 mL porcelain dish. Rinse the precipitate using 100 mL of 96% ethanol and place a cup filled with filtrate on top of the water bath until thickened.

Reagent Manufacturing

Preparation of 1% KMnO4 solution. KMnO4 weighed 1 g, then put into a 100 mL measuring flask. Then a little aquadest is added and whipped until dissolved. Then suffice the aquadest to the limit mark.

Preparation of 1% iodine solution. Iodine P weighs as much as 2 grams and is dissolved into a solution of 3 grams of potassium iodide P, then sufficient with equates up to 100 mL (Tahir et al, 2016).

Manufacture of 5% ammonium molybdate reagent. A total of 5 g of ammonium molybdate was dissolved in 100 mL of aquades (Tahir et al., 2016).

Qualitative Analysis

The sample contains Vitamin C if 1 mL of KMnO4 solution is mixed with 1 mL of curry leaf sample solution, it turns brown (Tahir et al, 2019).

Samples contain Vitamin C if added with iodine reagents and the iodine color will be lost (Tahir et al, 2016).

The sample contains Vitamin C if the sample is added with a 5% molybdate ammonium reagent, a molybdenum blue color is formed (Tahir et al., 2016).

Manufacture of Vitamin C Mother Solution

Preparation of vitamin C mother solution 1000 ppm. Vitamin C of as much as 0.05 grams is put into a 50 mL beaker and then dissolved with 96% Ethanol. Next, the solution is put into a 50 mL measuring flask squeezed to the limit mark, and homogenized.

Preparation of vitamin C mother solution 500 ppm. Vitamin C 1000 ppm mother solution pipette 12.5 mL then put into a 25 mL measuring flask, then squeezed with 96% Ethanol to the limit mark and homogenized.

Preparation of vitamin C solution 100 ppm. The 500 ppm Vitamin C mother solution is pipette 5 mL then put into a 25 mL measuring flask, then squeezed with 96% Ethanol to the limit mark and homogenized.

Preparation of vitamin C solution 50 ppm. The 50 ppm Vitamin C mother solution is pipettes of 12.5 mL then put into a 25 mL measuring flask, then squeezed with 96% Ethanol to the limit mark and homogenized.

Quantitative Analysis

Determination of the maximum wavelength. Vitamin C solution of 100 ppm as much as 5 ml is inserted into a 25 mL measuring flask (concentration 50 ppm). Then ethanol is added to the limit mark and homogenized. Maximum absorption was measured at wavelengths of 200–400 nm using ethanol blanks.

Preparation of a standard solution of ascorbic acid. Vitamin C solution of 50 ppm pipette consecutively as much as 0.8 mL each; 1.2 mL; 1.6 mL; 2 mL; 2.4 mL and 2.8 mL, then put into a 10 mL measuring flask. Then it is squeezed with a 96% Ethanol solution to the limit mark and homogenized.

Determination of vitamin C levels with a UV-Vis spectrophotometer. The extract was weighed 10 mg and dissolved in 10 ml of ethanol p.a (10 ppm) in a 10 ml measuring flask as

much as 3 times replication. Pipetted as much as 100 μL and dissolved in 10 ml ethanol p.a (10 ppm) in a 10 ml measuring flask as much as 3 times replication.

Research Flow Chart

In conducting this research, it has stages of research that need to be carried out in sequence. To facilitate understanding, a research flow chart is presented in Figure 1.
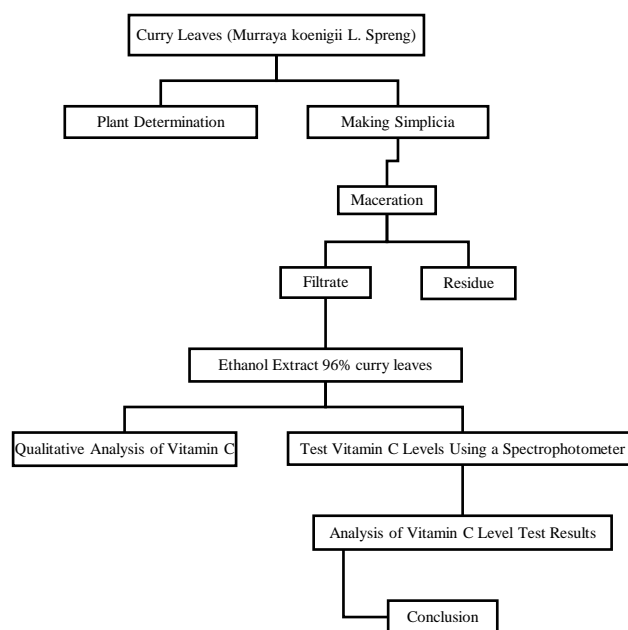

Figure 1
Research Flow Chart

RESULTS AND DISCUSSION

Plant Determination

The result of Number determination is obtained. 067/541/102.20/2023 shows that the materials used in this study came from curry/laurel koja plants, kingdom Plantae (plants), division Magnoliophyta (flowering plants), class Dicotyledonae, Geraniales, tribe Rutaceae, genus Murraya, and type Murraya koenigii (L.) Spreng. The morphology of curry leaves is compound, aromatic, pinnate, 11–21 leaves, 2–4 cm x 1–2 cm.

Simplisia Creation

Making simplisia is done by artificial drying, namely using a drying cupboard with a temperature of 50 ° C (Muliyawan, Taufiqurrahman, &; Edyson, 2018). The initial weight of curry leaves of as much as 3 kg was obtained dry simplisia of as much as 0.8 kg experienced a drying shrinkage of 7.6%, dry simplisia was powdered using a blender and sifted with an 80 mesh sieve. The results of each stage can be seen in Figure 1.

Picture 1
(a) Curry leaf collection, (b) Wet Sortation, (c) Dry Sortation, (d) Simplisia Powder

Ekstraksi

Figure 2
Viscous Extraction

Curry condensed extract (Murraya koenigii L. Spreng) obtained as much as 4.9 grams with a yield of 9.8% which means that from the total ethanol condensed extract, there is 9.8% extract from curry leaf plants. The extraction results can be seen in Figure 3. and Table 1.

Table 1
Extraction Results

Simplisia weights	Extract Weights	Rendering	Extract Characteristics		
			Shape	**Color**	**Smell**
50 g	4,9 g	9,8%	Thick	Dark Green	Typical of such an orange-smelling leaf is aromatic.

Qualitative Analysis of Vitamin C

The test with KMnO4 reagent obtained positive results for the presence of Vitamin C characterized by a change in color to brown in the sample solution. The results can be seen in Figure 3.
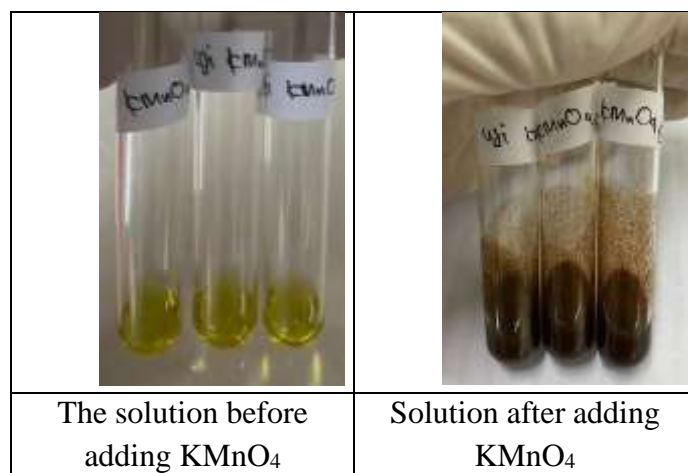

The solution before adding KMnO$_4$	Solution after adding KMnO$_4$

Figure 3
KMnO4 Reagent Test Results

Tests with iodine reagents get negative results for the presence of Vitamin C because there is no color change (Wiendarlina &; Sukaesih, 2019). The results can be seen in Figure 4.
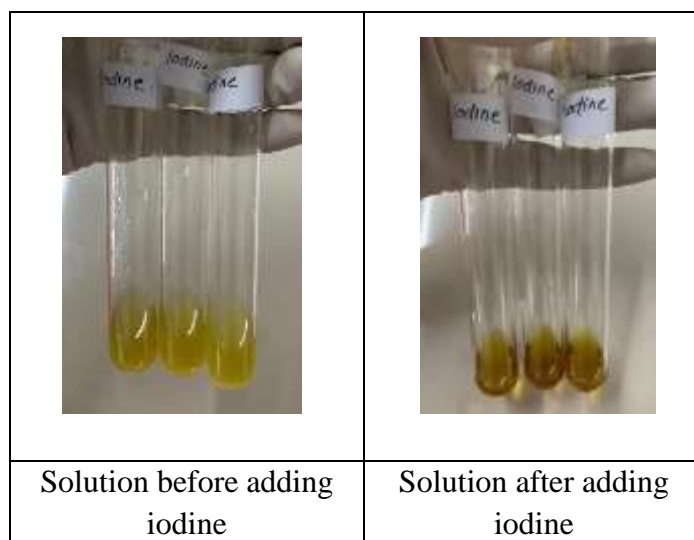

Solution before adding iodine	Solution after adding iodine

Figure 4
Iodine Reagent Test Results

Tests with ammonium molybdate reagent get positive results for the presence of Vitamin C characterized by color changes and white deposits formed (Mulyani, Larasati, &; Herlina, 2018). The results can be seen in Figure 5.
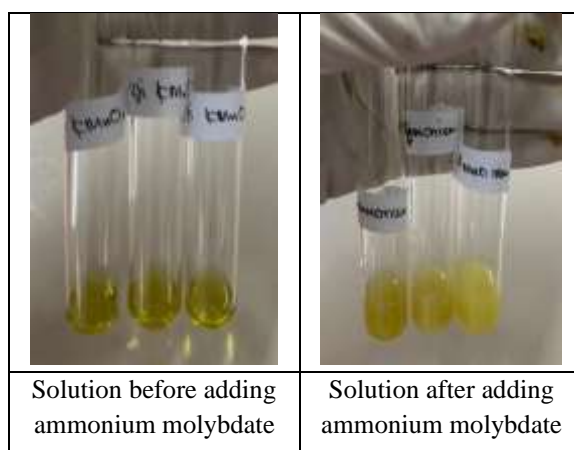
| Solution before adding ammonium molybdate | Solution after adding ammonium molybdate |

Figure 5
Ammonium Molybdate Reagent Test Results

Quantitative Analysis of Vitamin C by UV-Vis Spectrophotometry

The maximum wavelength in UV-Vis spectrophotometry was carried out on Vitamin C raw solution in the absorption range of 200 nm - 400 nm (Kurniawati &; Riandini, 2019). Because Vitamin C has chromophore and autochrome groups, from the results obtained the raw solution of Vitamin C shows a maximum wavelength of 245 nm at an absorbance of 2.99374. The maximum wavelength of ascorbic acid is 245 nm selected based on the highest absorption according to Figure 6.
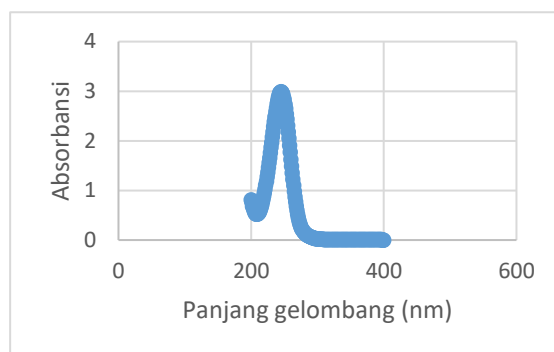

Figure 6
Vitamin C Calibration Curve

Then determine the standard curve equation, with the results of the absorption of the standard curve solution contained in Table 2.

Table 2
Ascorbic Acid Standard Curve Data

Concentration (ppm)	Absorbance at 245 nm
4	0,350577
6	0,437816
8	0,537293
10	0,640952
12	0,645124
14	0,2362

The standard concentration is obtained by the standard curve equation as shown in Figure 8. which can be used to calculate Vitamin C levels in Curry Leaf extract (Erma Yunita et al, 2019).

Figure 7
Fuck regression linear fuck Baku

The standard curve in this study obtained the equation line y = 0.0431x + 0.087, with a correlation coefficient (r) of 0.9674. The acceptance criterion of the correlation coefficient is (r) of r > 0.99 showing very good linearity means that the curve between absorption and concentration is linear (Dewi, 2018), that is, if there is an increase in the concentration value, the absorption value also increases (Lestari, 2001). This means that the standard curve depicts a perfect positive correlation with all experimental points located in a straight line with a positive slope (Erma Yunita et al, 2019).

Furthermore, the determination of Vitamin C levels obtained Vitamin C levels in curry leaves amounted to 3,962 ppm. More details can be seen in Table 3.

Table 3
(Curry Leaf Extraction Results (Murraya koenigii L. Spreng)
Percentage of Vitamin C Levels in Sample 10 ppm

Replication	Absorbance 245 nm	Until (ppm)
1	0,224483	3,1898
2	0,255429	3,9078
3	0,293381	4,7884
average	**0,257764**	**3,962**

CONCLUSION

It was concluded that 96% ethanol extract in curry leaves (Murraya koenigii L. Spreng) contains Vitamin C (Firdha, 2022). This is evidenced by conducting a qualitative analysis of Vitamin C in 96% ethanol extract of curry leaves with the first KMnO4 being positive marked by a change in color to brown (Eka, 2013), second with iodine reagent being negative because there is no color change, and third with Ammonium Molybdat marked by color change and white precipitate formed (Mardiyah, Kunsah, Rini, &; Samsudin, 2019). So it can be proven the content of Vitamin C in 96% ethanol extract of curry leaves (Murraya Koenigii L. Spreng). In quantitative analysis of Vitamin C levels of curry leaf extract (Murraya Koenigii L. Spreng) obtained an average level of Vitamin C which is 3,962 ppm.

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